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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/817,264	04/02/2004	Clark E. Lubbers	STL11420	1793

7590 08/03/2006

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EXAMINER

VERBRUGGE, KEVIN

ART UNIT	PAPER NUMBER
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2189

DATE MAILED: 08/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

10/817,264

Applicant(s)

LUBBERS ET AL.

Examiner

Kevin Verbrugge

Art Unit

2189

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 8, 9, 13, 14, 16-21, 25 and 27-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 8, 9, 13, 14, 16-21, 25 and 27-34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/12/05
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4, 8, 9, 16, 17, 21, 25, 27-29, 33, and 34 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,258,984 to Menon et al.

Regarding claims 1, 16, 27, and 29, Menon shows the claimed invention in Fig. 2 where he shows an array of equal capacity data storage units as claimed. In the brief description of Fig. 2 in column 4, lines 54-60, he refers to these data storage units as blocks and spaces. Each data storage unit is defined in terms of a plurality of separate storage domains or DASDs as claimed. The DASDs are labeled 1-6 and shown as a column of storage blocks.

Each of Menon's data storage blocks is allocated for either user data or fault tolerance data as shown in Fig. 2 (d1, d2, d3, etc. refer to user data while p1, p2, p3, etc. refer to fault tolerance data).

Regarding claims 2, 28, and 33, Menon's device performs the claimed aligning since each data storage block begins at a certain address (what he calls a synchronous

array address, see column 3, lines 48 and 55 and column 9, lines 36-38) and each data storage block is the same size, so subsequent data storage blocks in the same parity group also begin at the same address.

Regarding claims 3, 21, and 25, Menon's device clearly uses pointers to identify selected data storage units. Pointers are merely addresses and Menon uses addresses to identify each data storage unit in the array.

Regarding claims 4 and 34, Menon's fault tolerance data is parity data.

Regarding claims 8 and 17, Menon defines a sparing table that designates at least one block in each row as a spare block as claimed (see Table 2 at column 10, lines 52-60 and Fig. 2).

Regarding claim 9, Menon further defines the sparing table to include the spare block on a different DASD for each row, as claimed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13, 14, 20, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,258,984 to Menon et al. in view of U.S. Patent 6,775,792 to Ulrich et al.

Menon does not explicitly disclose the claimed metadata entry. His device includes plural arrays, as shown in Figs. 4-7, so there must certainly be some type of data structure to identify data storage units in the various DASDs and arrays of his device.

Ulrich discloses using metadata entries as claimed "to maintain coherence in the data stored to the disk array" at column 52, lines 4-29. There he also teaches that "Space allocation information is maintained by the server 140 in a metadata structure known as a Gee Table. The Gee Table contains information used to identify the mapping and distribution of blocks within the disk array 140 and is updated as data is stored to the disks 2305."

It would have been obvious to one of ordinary skill in the art at the time the invention was made to include metadata entries in Menon's device to maintain coherence in the data stored to the disk array, as taught by Ulrich.

Claims 18, 19, 30, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,258,984 to Menon et al.

Regarding claim 18, Menon discloses the claimed invention as discussed above with the exception of reallocating the data storage units in accordance with a second selected storage format.

Reallocating the data storage units (also called reconfiguration) in a storage array was a common practice at the time of the invention and was practiced for different reasons. Some configurations (RAID 1, for example) provide maximum data protection because two copies of the data are stored. The price paid for this redundancy is quite high, however, since the storage array must have twice as many disks as necessary to store a single instance of the data. Other configurations (RAID 5, for example) store some redundancy information to tolerate some level of data loss due to disk failure, but do so at a much lower cost, since just an extra disk or two is typically required.

It was known at the time of the invention to use one configuration in the early stages of data array operation (RAID 1, for example) and then migrate to another storage format (RAID 5, for example), as conditions changed (such as running out of disk storage space). The second storage format provides some protection against data loss but at a lower cost in terms of space required.

In view of this known reconfiguration technique, it would have been obvious to one of ordinary skill in the art at the time the invention was made to reallocate the data storage units of Menon to a second storage format once the number of data storage units in a second storage format outnumbered the number of data storage units in a first format as claimed. At that point, the second storage format is predominant and it would

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have been obvious to reconfigure the entire array to the second storage format rather than keep a portion in the first format and a portion in the second format.

Regarding claim 19, Menon shows a second array in Figs. 4-7 which can be used for additional storage space as claimed.

Regarding claim 30, Menon does not show a row without parity data. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include such a row if storage space were at a premium since fault tolerance data consumes storage space without adding to the storage capacity.

Regarding claim 31, Menon shows data stored in a RAID 5 storage format. Furthermore, the particular choice of RAID level is a matter of design choice.

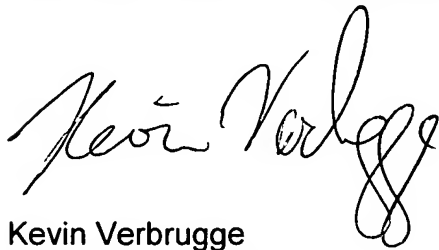
Conclusion

Any inquiry concerning this Office action should be directed to the Examiner by phone at (571) 272-4214.

Any response to this Office action should be labeled appropriately (including serial number, Art Unit 2189, and type of response) and mailed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, hand-carried or delivered to the Customer Service Window at the Randolph Building, 401 Dulany Street, Alexandria, VA 22313, or faxed to (571) 273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197.

A handwritten signature in black ink, appearing to read "Kevin Verbrugge". The signature is fluid and cursive, with the first name "Kevin" and last name "Verbrugge" clearly distinguishable.

Kevin Verbrugge
Primary Examiner
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